

**CEROPTERA SIVINSKII, A NEW SPECIES OF SPHAEROCERIDAE
(DIPTERA) IN A GENUS NEW TO NORTH AMERICA,
ASSOCIATED WITH SCARAB BEETLES IN
SOUTHWESTERN UNITED STATES**

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Abstract.—*Ceroptera sivinskii*, n. sp., is described from specimens found on dung beetles from Florida and Mississippi, and its relationship to Old World species of *Ceroptera* is discussed. This is the first species of *Ceroptera* to be described from the Nearctic Region.

Species of the genus *Ceroptera* Macquart have long been known to cling to the backs of dung-storing scarab beetles and at least one species of the genus has been observed to oviposit in the scarab's dung ball as it is buried (Roubaud, 1916).

Although *Ceroptera* is a widespread genus with several species in Africa and the warm parts of the Palaearctic Region, its presence in the Nearctic Region has not been recorded previously. Knab (1915) observed two species of *Borborus* riding on *Canthon viridis* Beauvais in Florida, but this observation probably pertained to a species of *Copromyza* (*Borborillus*), species of which have recently been observed on scarabs (J. Sivinski, personal communication). Neotropical species formerly placed in *Ceroptera* are quite distinct and have been placed in a separate genus, *Archiceroptera* Papp (Papp, 1977).

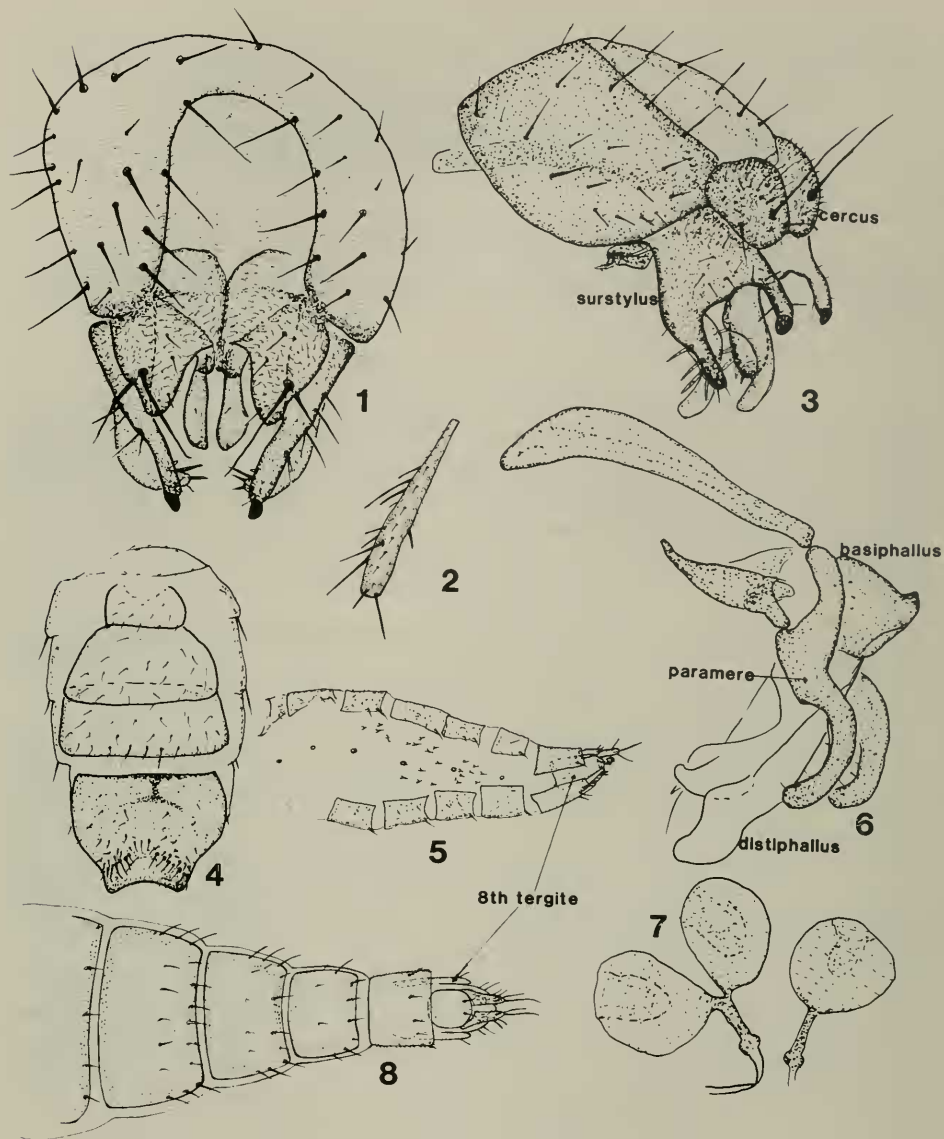
Even though *Ceroptera sivinskii* is very similar to species currently placed in *Limosina* Macquart, it shares a number of important synapomorphies with Old World species of *Ceroptera* and probably represents the plesiomorph sister group to the Old World *Ceroptera*.

***Ceroptera sivinskii* Marshall, NEW SPECIES**

Figs. 1-11

Species of *Ceroptera* can be distinguished from similar North American species by the following characters: Brown with grey dusting, size 2.5 mm. Eyes small; interfrontal bristles in 7-8 pairs; orbital setulae in 2 long rows. Wing without an anal cell; midtibia with a long apicoventral bristle; notum with 1 pair of dorso-central bristles. Male surstyli with long anterior and posterior lobes; female post-abdomen retractile.

Description:—*Head:* Interfrontal area long and narrow, bordered by 7-8 pairs of interfrontal setae (Fig. 10). Two lower orbital bristles, inner vertical bristles, postverticals, and ocellar bristles similar in length; upper orbitals longer; outer verticals and postocellars shorter. Orbital setulae forming 2 rows extending from



Figs. 1-8. *Ceroptera sivinskii*. 1, Male postabdomen, posterior view. 2, Male midtibia, anterior view. 3, Male postabdomen, posterolateral view. 4, male preabdomen, ventral view. 5, Female abdomen, lateral view. 6, Male internal genitalia, posterolateral view (distiphallus not stippled). 7, Spermathecae. 8, Female abdomen, dorsal view.

below the upper orbitals to below the eyes; inner row inclinate, outer row latero-clinate. Face concave and carinate. Eyes small, eye : cheek ratio, 1:1.3. Vibrissal length slightly shorter than $\frac{1}{2}$ face width, subvibrissa $\frac{1}{2}$ as long as vibrissa. Gena with 2 rows of setulae.

Thorax: One pair of prescutellar dorsocentrals. Acrostichal setulae forming 8 rows between dorsocentral areas, prescutellar acrostichals not enlarged. Scutellum broadly rounded, slightly wider than long, with 4 marginal bristles. Katapisternum

with a large posterodorsal bristle reaching almost to wing base, 1 or 2 small bristles anterior to posterodorsal, and several setulae ventrally.

Legs: All tarsi somewhat elongate and curved (Fig. 9). Midtibia with 3 anterodorsal bristles on proximal $\frac{1}{3}$ and 4 anterodorsals on distal $\frac{1}{3}$ (Fig. 2); and with a midventral and apicoventral bristle. Hindtibia with a very weak apical spur.

Wings (Fig. 11): Membrane whitish, veins yellow. Ratio of 2nd costal sector to 3rd 3:2 in female; in male 2nd costal sector slightly longer than 3rd; costa ending just beyond R4+5. Halter yellow.

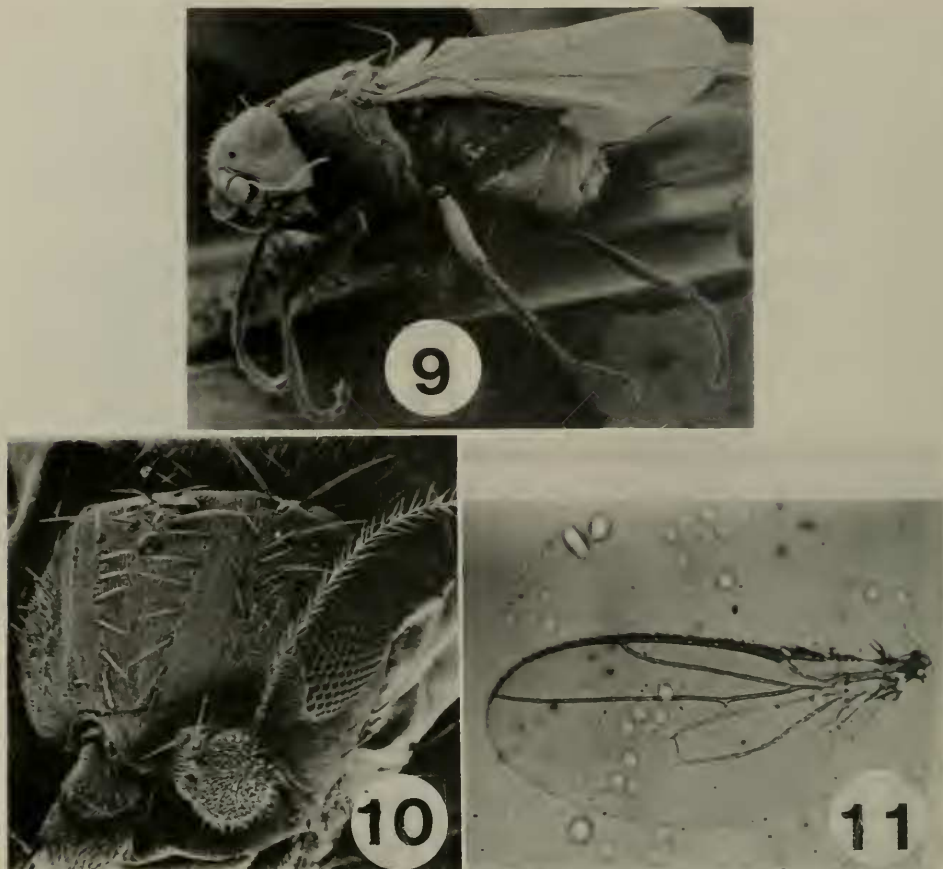
Male abdomen: Sterna as in (Fig. 4), 5th sternum elongate, its distinctive posterior margin covering the genital pouch. Cerci distinct, somewhat bulbous; surstyli deeply cleft, posterior lobe with stout, blunt spur at tip, anterior lobe broader and with numerous bristles (Figs. 1, 3). Internal genitalia as in Fig. 6, distiphallus narrow, elongate, weakly sclerotised but of complex structure. Ejaculatory apodeme apparently absent.

Female abdomen: Pleura with scattered tubercle-based setulae (Fig. 5). Segments 6–10 tapered gradually from rest of abdomen but capable of telescoping. Tergum 8 unsclerotized dorsally, present only as 2 lateral sclerites, these usually telescoped into segment 7. Epiproct and hypoproct small but distinct, cerci digitate with terminal and subterminal bristles.

Types.—Holotype ♂, Florida, Alachua Co., 10.iv.1980, on back of *Canthon*, J. Sivinski (CNC). Allotype ♀, Florida, Alachua Co., 28.ii.1980, on *Geotrupes* approx. 5 cm under cow dung, J. Sivinski (CNC). Paratypes (6 ♂, 4 ♀): Florida, Alachua Co., 18.iii.1980, under cow dung, J. Sivinski (SAM); Alachua Co., 1.iv.1980, under cow dung, J. Sivinski (SAM); Alachua Co., 1.iii.1980, on male *Phaneus vindex* about 3 cm under cow dung, J. Sivinski (SAM); Hernando Co., 2 mi. W. Croom, Withalacoochee State Forest, iv.1971, dung trap in pine forest with scattered oak. A. Newton (MCZ); Clay Co., Orange Park, 25.iii.1952, O. Peck (CNC). Mississippi, Scott Co., Bienville National Forest, Raworth Campground, 10–14.iv.1972, dung trap in pine forest, A. Newton (MCZ). (CNC = Canadian National Collection, Ottawa; MCZ = Museum of Comparative Zoology, Harvard University, Cambridge, Mass.; SAM = S. A. Marshall collection.)

Discussion.—The Nearctic species most similar to *C. sivinskii* are currently placed in *Halidayina* Duda and *Limosina* Macquart. Most North American workers follow Richards (1965) in including *Limosina*, *Halidayina*, and related taxa as subgenera of *Leptocera* Olivier. If this classification is to be retained, *Ceroptera* would have to be included as a subgenus of *Leptocera*. *Ceroptera* is more closely related to subgenus *Limosina* than to several other *Leptocera* subgenera. The wing venation of *Ceroptera* is of the derived type (no anal cell, medial veins extending slightly beyond end of discal cell) which is the major synapomorphy for the genus *Leptocera* (sensu Richards, 1965). Characters in common between *C. sivinskii* and *Limosina* include 4 scutellar bristles, an apical ventral bristle on the midtibia, a modified fifth sternum overlapping the straplike sixth sternum, 3 spermathecae, and the basic configuration of the male genitalia. *Ceroptera sivinskii* is also similar in size to *Limosina*, being much smaller than other *Ceroptera*.

Papp (1977) included *Ceroptera* in a subfamily Ceropterinae Vanschutbroeck, largely distinguished on the basis of a small ventroapical spur on the apex of the hindtibia, a retractile, partially desclerotised female abdomen, and the presence of enlarged tarsal claws and pulvilli. *Ceroptera sivinskii* is intermediate in these characters between Ceropterinae and related taxa. Its hindtibial spur is small,



Figs. 9–11. *Ceroptera sivinskii*. 9, Male habitus. 10, Anterodorsal view of head. 11, Wing of male.

barely larger than that in many *Limosina* and the pulvilli and claws are more similar to those of *Limosina* species than those of Old World *Ceroptera*. The female postabdomen of *C. sivinskii* is retractile, but neither desclerotised nor rapidly tapering as in the *Ceroptera* species examined by Papp (1977).

Although *C. sivinskii* differs from Old World *Ceroptera* in the above proposed subfamilial characteristics, numerous synapomorphies provide good evidence for the inclusion of Old and New World forms in the same genus. The abdomen of female *C. sivinskii*, although not rapidly tapering and desclerotised, has tergum 8 divided into lateral plates and telescoped into the 7th segment as is the case in the Palaearctic species *C. rubicornis* Duda. The long, narrow, interfrontal plate bordered by numerous interfrontal bristles, the double row of orbital setulae, the strong facial keel, the eye reduction, the tubercle based setulae on the female abdominal pleurae, and the habit of riding on dung beetles, are more obvious synapomorphies shared by *C. sivinskii* and the rest of *Ceroptera*.

The male postabdomen of *C. sivinskii* is very similar to that of the Palaearctic *C. rubicornis*, *C. alluadi* Villeneuve, and *C. rufitarsis* Meigen. *Ceroptera rufitarsis*, the type-species of *Ceroptera*, is figured by Hackman (1969), and I have examined males of the other two Palaearctic species. All three Palaearctic species

have anterior and posterior surstylar lobes which actually constitute one deeply cleft surstylus with a narrow posterior lobe and a broader, bristled anterior lobe; clearly derivable from the less deeply cleft surstylus of *C. sivinskii*. The internal genitalia of *C. sivinskii* is similar to the three Palaearctic species in that all four species have a very long, narrow distiphallus which is indistinctly separated from the basiphallus. These species also share a short hypandrium and simple, blunt-tipped parameres, however, the Palaearctic species have broader parameres. The basiphallus structure is similar among all four species; however, *C. rubricornis* has a long epiphallus and the basiphallus of all three Palaearctic species is longer and thinner than that of *C. sivinskii*. Based on Hackman's (1965) figures and an examination of one African species (*C. nasuta* Villeneuve), *C. sivinskii* is much more closely related to Palaearctic than to Ethiopian *Ceroptera*. The African males examined have a very long hypandrium, a long, curved epiphallus, and surstyli with anterior and posterior lobes very different from, but probably derived from, the elongate and simple form found in Palaearctic species.

Ceroptera probably evolved from a *Limosina* like ancestor that was associated with scarabs. *Ceroptera sivinskii* is probably the *Ceroptera* species most similar to that ancestor, and could be the plesiomorph sister taxon to the old world *Ceroptera*. *Ceroptera*, including this new Nearctic species, should be treated at the same categorical level as its close relatives *Limosina* and *Halidayina*. Roháček (*in press*) has monographed the Palearctic *Limosina* and related groups, recognizing them as genera of the subfamily Limosininae Frey (=Leptocerinae Hackman, 1969). The evidence presented here supports the recognition of *Ceroptera* as a genus within that subfamily, and does not support the recognition of a subfamily Ceropterinae.

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